CLAIMS

1. A thin film electrical heating element including a layer of an electrically conducting metal oxide on an electrically insulating substrate, said metal oxide layer being doped with at least one rare earth element.

2. A thin film heating element according to claim 1 wherein said metal oxide layer includes at least two rare earth elements.

3. A thin film heating element according to claim 2 wherein said two rare earth elements are present in said metal oxide layer in substantially equal concentrations.

4. A heating element according to claim 2 or 3 wherein said at least two rare earth elements include both cerium and lanthanum.

5. A heating element according to claim 1 wherein said metal oxide is tin oxide.

6. A heating element according to claim 2 wherein said metal oxide layer further includes substantially equal quantities of donor and acceptor elements.

7. A heating element according to claim 6 wherein said donor and acceptor elements are respectively antimony and zinc.

8. A heating element according to claim 6 wherein said metal oxide layer is substantially free of fluorine.

9. A heating element according to claim 1 wherein said heating element is stable at a power density of 20 watts cm^{-2}.

10. A heating element according to claim 1 wherein said heating element is stable at a temperature of 650°C.

11. A thin film heating element according to claim 1 wherein said metal oxide is deposited on said substrate by pyrolysis of an organometallic base solution containing said at least one rare earth element.

12. A thin film heating element according to claim 11 wherein the or each rare earth element is present in said solution at a concentration up to 5 mol %.

13. A thin film heating element according to claim 12 wherein said at least one rare earth element includes both cerium and lanthanum.

14. A thin film heating element according to claim 13 wherein cerium and lanthanum are each present in said solution in the range of approximately 1.25 mol % to approximately 3.75 mol %.

15. A thin film heating element according to claim 14 wherein the concentration of each of cerium and lanthanum in said solution is approximately 2.5 mol %.

16. A thin film heating element according to claim 11 wherein said solution further includes substantially equal quantities of donor and acceptor elements.

17. A thin film heating element according to claim 16 wherein each of said donor and acceptor elements are respectively antimony and zinc and are each present in said solution at a concentration of approximately 2.8 mol %.

18. A thin film heating element according to claim 11 or 13 wherein said base solution is monobutyl tin trichloride.

19. A method for the manufacture of a thin film heating element including the step of depositing a layer of metal oxide onto an electrically insulating substrate by pyrolysis of an organometallic base solution containing at least one rare earth element.

20. A method according to claim 19 wherein said solution contains at least two rare earth elements.

21. A method according to claim 20 wherein said two rare earth elements are present in said solution in substantially equal concentrations.

22. A method according to claim 19 wherein said at least one rare earth element is present in said solution in the range of approximately 1.25 mol % to approximately 3.75 mol %.

23. A method according to claim 20 wherein said at least two rare earth element includes both cerium and lanthanum.

24. A method according to claim 23 wherein said cerium and lanthanum are each present in said solution in substantially equal concentrations.

25. A method according to claim 19 wherein said base solution is monobutyl tin trichlorde.

26. A method according to claim 19 wherein said solution further includes chlorides of at least one donor and at least one acceptor element, said donor chlorides and acceptor chlorides being present in said solution in substantially equal concentrations.

27. A method according to claim 26 wherein said donor chloride is antimony chloride and said acceptor chloride is zinc chloride.

28. A method according to claim 19 wherein said solution is substantially free of fluorine.

29. A method according to claim 19 further including the step of annealing said metal oxide layer on said substrate for at least one hour at a temperature higher than the substrate temperature used during said pyrolysis.